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Abstract

This study monitors the effects of economic transition on wages and employment in a former Soviet Republic. Estonia's case is of particular interest because of its early adoption of relatively free labor market policies. Relative wages for the highest educated groups rose for all age groups. There were also rapid increases in returns to job experience, particularly at young ages. Increasing wage dispersion across human capital groups was accompanied by narrowing wage dispersion within human capital groups. Relative wages rose in sectors which gained relative employment, while relative wages fell in shrinking sectors, suggesting that labor market equilibrating mechanisms developed very rapidly in Estonia

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Since the collapse of the Soviet economic system, researchers have expended considerable effort toward monitoring the progress of transition toward a market economy. For various reasons, the most reliable information has been produced on Central European economies. The process of transition began earlier in these countries, making Central European countries useful test cases for other transition economies. Several of these countries also had the advantage of having available data on individual workers which allowed detailed analysis of their labor markets. Consequently, knowledge of labor markets in Bulgaria, the Czech Republic, East Germany, Hungary, Poland, Slovakia, and Slovenia is fairly advanced.[1] These countries may also have had the advantages of proximity to and long-term relationships with western economic researchers, meaning that there was a stock of potential researchers from which to draw when the need for research on transition began.

Among the conclusions that can be drawn from the Central European experience is that transition to a market economy requires large redeployment of workers from noncompetitive sectors, that these redeployment can have substantial costs in terms of unemployment and lower production, and that real wages can drop substantially in the early years. At the same time, efforts to avoid the costs of transition by encouraging early retirement, maintaining high unemployment benefits or pensions, subsidizing unprofitable firms, or restricting bankruptcies can make the problems worse by taxing the emergence of new firms and employment opportunities. Wage inequality rose in transition economies as centrally planned wage setting mechanisms were disabled. Under the socialist system, wages for the most productive were suppressed in the interest of maintaining egalitarian wage structures. Transition sharply increased wages for the

better educated relative to the least-educated workers. Transition may also have increased relative productivity of the better educated workers, both because of the decline of low-skill intensive sectors such as manufacturing and agriculture, and because of increased need for decision making skills.[2]

Much less is known about the progress of transition in countries which were states of the former Soviet Union. There is little data from the period before transition since these countries were previously tied into the Soviet statistical ministry which held all records. Data during transition has been fragmented and incomplete, since labor force surveys have yet to replace the dismantled Soviet statistical system.[3] Lack of physical and/or political proximity to the West also meant that these countries were less integrated into the international community of scholars. The stock of available expertise in Eastern European economies was much more limited than was the case for Central Europe. Finally, transition began later in these countries, and so attention of researchers concentrated on countries where the transition was at a more advanced stage.

Nevertheless, research on former Soviet economies can shed additional light on many important dilemmas faced by transition economies. First, the former Soviet states were much more integrated into trade within the Council for Mutual Economic Assistance than were Central European economies of the socialist block. As such, collapse of trade within the socialist block may have generated an even greater shock to these economies, particularly to Baltic states which have stayed outside the CIS. Therefore, in the former Soviet states the scale of labor reallocation and displacement caused by transition to market may be larger, and hardship deeper and more protracted. Second, CEE economies have afforded a much more generous social safety net and more protective labor market policies than former Soviet states, including government sponsored early retirement programs, generous pensions, longer eligibility for and higher replacement rates

of unemployment insurance, and longer advance notification of layoffs. These policy differences across countries will allow researchers to compare the relative success of interventionist versus free market labor policies. Third, there may be different groups of winners and losers in transition in the former Soviet states than in Central Europe. Research on Central Europe has produced consensus results that relative returns to education increase, but studies provide mixed conclusions regarding returns to experience or wages for women or ethnic minorities. Fourth, because economic transition in the former Soviet states coincided with the creation or recreation of these countries, governmental institutions had to be created at the same time as the market institutions. It is unclear if this is a disadvantage, since adapting existing government institutions to a market economy may be more costly than establishing new institutions. Nevertheless, Eastern European countries began the transition with governmental institutions that differed greatly from those in Central Europe.

This paper reviews progress of labor market transition in Estonia. Estonia makes a particularly interesting case in that it opted for much more radical free market policies than its sister states. The country placed few roadblocks in the way of international trade, layoffs, bankruptcies, or foreign ownership of firms. Estonia also opted for very low levels of unemployment benefits, pensions, and minimum wages. Whether in spite of or because of these policies, Estonia has made rapid progress. Based on a newly completed retrospective survey of the Estonia labor force covering the period from 1989 (before transition) to 1995, this study shows that a tremendous amount of labor redeployment has already occurred. Workers have exited agriculture and manufacturing in substantial numbers, but employment in newly emerging industries has increased sufficiently to leave total employment only about ten percent below its 1989 level. Real wages and employment have rebounded, and the unemployment rate is lower

than in most other transition economies. The pattern of changes in relative employment and relative wages are quite consistent, indicating that labor redeployment appears to be responding to wage signals provided by the labor market. This bodes well for further progress in lowering unemployment and raising output in Estonia. As such, Estonia offers valuable lessons for other Eastern European transition economies, and may suggest policy reforms for Central European economies as well.

I. Labor Market Policies during Transition

Whether by design or accident, the Estonian labor market policies consistently encourage labor market mobility. For a transition economy, transition inducing policies seem quite sensible. Encouraging the creation of new firms and hires and not discouraging the destruction of unprofitable firms or job matches should hasten movement toward new labor market equilibria.

For displaced workers, the primary mechanism to encourage mobility toward other sectors is the provision of up to six months of free job training. While training, the unemployed get a subsidy that dominates the unemployment insurance benefit. Given this incentive, almost forty percent of the unemployed opted to receive training in 1994. This training included not only job training, but also lessons in Estonian language (if needed) and in job search. In contrast, less than ten percent of the unemployed in Central Europe have received training. A second means of encouraging the unemployed to reemploy is a program of assisted self-employment. The unemployed can qualify for assistance in setting up a new business upon submission of an approved business plan.

The returns to remaining unemployed in Estonia are unusually low. Unemployment benefits average below 10 percent of wages. Eligibility lasts six months with up to a three month extension for various circumstances. To receive benefits, recipients must report to the

employment office twice per month. A failure to report, or if a recipient receives a job offer and refuses, he loses two weeks of benefits. A second failure or job offer rejection eliminates benefit eligibility. In addition, those who are receiving unemployment benefits must accept up to 10 days of public works jobs if offered, and about one in five unemployed experience this direct job creation. The upshot of these policies is that there is little incentive (or option) of being idle. Consequently, Estonia has a relatively high rate of transition from unemployment to work.[4]

The Estonian labor market policies impose few costs on new hires or fires. Unemployment benefits are paid out of the general fund and not by an experience rated tax. As such, firms do not face higher insurance costs if they lay off workers. There are no other effective costs of firing workers such as mandatory severance packages, job placement, or retraining. As is well known, low exit barriers imply low entry barriers, so low firing costs imply lower hiring costs.[5] Firms have an incentive to add workers even for short-term needs.[6] Wage costs of accessions are also modest. The minimum wage is so low that it also fails to serve as a barrier to new hires: prevailing wages are higher than the minimum.[7] There is no effective trade union movement raising wages either. Finally there is no policy to keep firms open to avoid layoffs or bankruptcy. Elsewhere, such subsidies to failing firms are, in effect, taxes on established or establishing firms. The low cost of employment and unemployment policies in Estonia averaging less than two-tenths of one percent of GDP imply an atypically small tax burden on firms. In contrast, labor market programs cost an average of 1.9 percent of GDP in Central Europe.

Despite having an old population relative to other transition economies, Estonia has a relatively low fraction of GDP allocated to pensions.[8] The low level of pensions also contributes to employment incentives and job creation. Since pensions have to be paid from the general fund, firms face relatively low burden of taxes for pension support. At the same time, the pension is so

low that there is little incentive to retire. Thus, we do not see the same type of massive outflow of older workers from the labor force as was true in Slovenia, for example.[9] Paying low pensions not only limits pension burden for the economy, but maintains a supply of relatively inexpensive experienced labor.[10]

Consistent with the free market orientation of the labor market policies, Estonia has not placed restrictions on new foreign investment in Estonia or foreign ownership of former state enterprises. Consequently, employment in foreign-owned firms has increased from 1.5 percent of workers in 1989 to 9.1 percent in 1995. The growth in private sector employment is even more dramatic, from 4.5 percent of employment in 1989 to 47.6 percent in 1995.

II. Data

This study aims to monitor changes in employment and wages during the initial period of transition to a market system in Estonia. The universe for the sample drawn for this study was the 1989 census of the Estonian population who were born between 1920 and 1979 (aged 16-75 in 1995). Unlike most earlier analyses, this data include those in the informal sector and is not conditioned on prior status in state enterprise. Thus, this data set is representative of all those engaged in economic activity. A sample of just over one of every 100 persons in that age group were selected, for a sample of 12,246 names. National and local address lists were used to locate these individuals. Ultimately, 9,608 (77 percent) were interviewed. Nonresponse was attributable to failure to locate an address for the individual (9.2 percent), emigration (7.6 percent), death (3.9 percent) and refusal to participate (1.7 percent). Much of the emigration was attributed to the return of ethnic Russians to Russia following Estonian secession from the former Soviet Union.

The questionnaire elicited information on wages and employment from the period before transition to the survey date in the first quarter of 1995. This required recollection of labor activities up to six years before the time of interview. Since such interviews are subject to recall bias, enumerators were carefully trained to cross check answers for employment and unemployment spells to insure consistency. There are several reasons to suspect that the information is reliable, even though it required recall over several years. First, research indicates that individuals recall traumatic events more readily, and changes of employment status are likely to have been particularly memorable in an economy transiting from a system with many years of constant steady employment. Secondly, because the centrally planned system emphasized stability of employment, wages and prices, the most distant recollections involved remembering relatively continuous events which rarely changed.

The 1989 census data on these same individuals can be compared to the responses in the 1995 survey to assess the extent of recall bias in the retrospective survey. The recall data on economic activity corresponded quite well with the 1989 responses, and the majority of the discrepancies are attributable to changes in labor force definitions. In 5.4 percent of the cases, the recall data indicated labor force participation when the census indicated inactivity. The opposite disagreement occurred in 3.2 percent of the cases. The former cases were concentrated among women in their twenties, and such mismatches are attributable to a change in labor force definition. Under the Soviet definition, women on maternity leave remained listed among the employed for up to 18 months, but were listed as inactive in the retrospective survey after 4 months. Disagreements in the opposite direction were concentrated among rural residents engaged in small-scale farming who were defined as employed in the retrospective survey but inactive in the census. Thus the bulk of the discrepancies were due to differences in how the same

labor market status was classified and not to recall problems per se. The remaining discrepancies matched the sample statistics for the overall population, so the discrepancies do not bias the outcomes. Wage information cannot be compared at the individual level, but the sample means of the wage information collected retrospectively matched the Statistical Office's contemporaneously collected wage data for all five years. Thus, the retrospective data appear to have replicated observed employment and wage patterns for the entire sample period.

Respondents were asked to report their earnings and employment status in October of 1989, and in 1992, 1993, and 1994, but not for high-inflation years of 1990 and 1991.[11] Data were also collected for March of 1995 when the data were collected. Economic reforms were first initiated in 1990. Estonia declared independence from the Soviet Union in August of 1991. Therefore, the first observation comes before any reforms were initiated and the remaining observations come at least one year after independence. Respondents also reported industry of employment and employer attributes (number of employees; state, cooperative/collective, or private ownership, and whether the employer is foreign) for each year. The survey also elicited information on human capital attributes including education, work experience and job tenure, and demographic information on place of birth and gender.

III. Results

The aim of the analysis is to document changing labor market outcomes in the Estonian transition with a particular emphasis on the changing importance of human capital. We also wish to document the speed and magnitude of the reallocation of labor across sectors, and whether these reallocations are consistent with signals being transmitted by changing wages. Finally, we wish to explore the impact of transition on foreign born (mostly ethnic Russians) and women who might have received more favorable treatment under the Soviet system. These objectives are met

by comparing measures of employment, wages and returns to human capital in transition years relative to measured outcomes in 1989 under the Soviet system.

A. Employment

Changes in employment by industry and human capital level are illustrated by the ratio of employment in 1994 relative to 1989 for each human capital cell. Relative success of a human capital group (listed in brackets) is measured by employment growth of the human capital group relative to employment growth in the industry as a whole. Human capital is measured first by experience groups (Table 1) and by education groups (Table 2).

The most striking finding about the Estonian transition is the large outflows from employment in the two largest sectors, agriculture and manufacturing. As shown in Table 1, full-time agricultural employment fell 45 percent between 1989 and 1994. Full-time manufacturing employment fell 25 percent. These two sectors alone account for a 16 percent reduction in employment in Estonia over the five year period. While such large potential dislocations have created pressure to preserve jobs through import restrictions, subsidies, bankruptcy limitation, or restrictive layoff policies in other transition economies, dislocations were allowed to occur in Estonia. Yet, overall employment in Estonia only fell ten percent. Obviously, some sectors must have grown to absorb some of the decline. In fact, seven of the thirteen sectors had employment increases over the period including utilities, retail and wholesale trade, hotel and restaurant services, finance, insurance and real estate (F.I.R.E.), government, education and health. The lack of the burden to support job retention contributed to broad growth elsewhere in the economy. While accessions still lag behind separations, it is not clear that more active efforts to preserve jobs would have resulted in a higher net employment rate.

The employment share of the youngest cohorts grew during transition. Relative employment for those with over 40 years of experience fell by 21 percent, 11 percent more than the average employment reduction. In contrast, employment of the youngest cohort actually rose 2 percent. Employment shares rose moderately or remained constant for those with 6 to 30 years of experience and fell moderately for those with 31-40 years of experience. Interestingly, the young gain employment, even though there was no effort to "make room" for them in the labor force by encouraging retirements. In contrast, employment shares for the young fell in Slovenia where pension policies led 75 percent of men to retire in a single year. It appears that encouraging retirements may not be the solution for underemployed young workers.

The exercise is repeated in Table 2 for full-time employed education groups. It is clear that transition has not had neutral effects on employment by skill level. Employment rises absolutely for those with university degrees, while at the same time it falls 56 percent for those with less than a primary degree. Employment for those with primary degrees fell 29 percent overall. The only sectors increasing use of primary educated workers were the government and retail and wholesale trade sectors. Even in the latter, primary employment share fell since the growth of overall employment in the trade sector exceeded the growth of primary employment.

Employment of workers with secondary degrees fell only 1 percent, while employment of those with special secondary degrees fell 6 percent.[12] Across the sectors, the two groups fared similarly, both gaining or both losing employment in 10 of 13 sectors. These workers seemed to gain from expanding sectors. In the six sectors which gained absolutely in employment (utilities, trade, hotel/restaurant, F.I.R.E., government, education, and health) employment for these two groups rose as well.

It is interesting that the relative demand for educated labor rose in every sector. Employment share for the least skilled fell in every sector, and fell in all but one for primary educated workers. Even as employment was falling dramatically in agriculture and manufacturing, the largest employment losses were absorbed by the least skilled. In contrast, university educated workers only lost significant employment share in hotel/restaurant and government. The broad conclusion from Table 2 is that the employed labor force became substantially more skill-intensive during the transition.

Women and immigrants both had slight declines in employment share over the period. Women represented 51 percent of employment in 1989, but 48 percent in 1994. The declines occur in eleven of the thirteen industries, the exceptions being telephone/transportation and education where women's shares were unchanged. The sharpest reductions in women's employment shares were in retail and wholesale trade, hotels and restaurants, FIRE, and business services, sectors where employment tended to grow faster than others. Apparently, women were less mobile than men in labor reallocations caused by the transition. This is particularly true for the least educated women who exited employment in greater numbers than did the best educated men. In contrast, the university educated women gained employment modestly during transition.

The nonEstonian share of employment fell from 35 percent in 1989 to 33 percent in 1994 with declining shares observed in all sectors but agriculture. The largest reductions were in hotels and restaurants, FIRE, and government, indicating relative immobility in moving toward expanding sectors. It should be emphasized that the loss of employment share for nonEstonians is understated because from the original sample, we only have data for those still living in Estonia. As mentioned above, after the break-up of the Soviet Union, a significant number of ethnic Russians migrated back to Russia. Outmigration of employed Russians would have implied a

total employment reduction of about 14 percent rather than the 10 percent implied by Table 1, and this would have implied lost employment shares for nonEstonians of about .06 rather than .02. While information on these migrants would alter the shares somewhat, the qualitative conclusions based on relative employment growth and decline in Tables 1-2 would not be affected.

B. Wages

Figure 1 shows the profile of average wages by experience group over the transition, where average wages in each year are normalized at 1. For each year, experience groups with above average earnings will lie above one, while those with below average wages will lie below one. In general, the wage-experience patterns in Estonia are very flat relative to market economies, the main feature being a sharp reduction after 40 years of experience. In 1989, the percentage difference in average wages from the peak at 40 years to the bottom at 50 years was only 16 percent. Transition lowered relative earnings for those with over 30 years of experience and raised relative earnings for those with less than 20 years of experience. By 1994, the apparent peak earnings were at 10 years of experience, and the percentage difference between peak wages and the lowest average wage was 45 percent. Relative wages rose for experience groups which also gained in relative employment in Table 1. This suggests that shifts in relative demand toward the younger workers were the driving force behind these changes in wage-experience profiles.[13]

A similar exercise in Figure 2 shows a dramatic evolution of the wage-education profile over the course of the Estonian transition. In 1989, the profile was very flat, with university educated workers earning only 8 percent above the economy-wide average and primary educated workers earning just 3 percent below average. Relative earnings for university educated workers

rose dramatically during transition, while relative wages for the two least educated groups fell. Within five years, the wage premium for university educated over primary educated workers rose from 11 percent to 69 percent, an impressive demonstration of relative wage adjustment in an economy moving out of a forty year experience with centrally-dictated wages. Consistent with the employment data, the pattern of relative wage adjustments suggests relative demand shifts toward more educated workers.[14]

Additional insights into the source of changing returns to education and experience come from Figures 3A and 3B. The paths of wages by experience groups are traced out for different education groups for 1989 and 1994. In 1989, the paths are constant or rising over time with a dramatic increase in relative wages for an educated elite with 40 or more years of experience. Perhaps even more surprising is the virtual lack of a pattern of wage advantages for more educated workers over less educated groups for most of the life cycle. In fact, at 20 years of experience, those with elementary training had higher average earnings than those with secondary degrees, who in turn had an advantage over those with university degrees. By 1994, this inverse returns to education pattern disappears. A nearly standard (market economy) separation between education groups is found. University educated workers earn more than secondary educated workers, who consistently earn as much or more than elementary educated workers. The change in profiles was primarily accomplished by sharply increasing returns for young university educated workers and sharply reduced relative wages for more experienced workers with elementary training or less.

While wage inequality was increasing across human capital groups, it actually declined within human capital groups. For example, the coefficient of variation of wages in 1989 varied from 1.27 to 1.7 within education groups, but varied between .66 and .95 in 1994. This would be

expected in a labor market with highly mobile labor since wages should equalize across sectors hiring equally-skilled workers. That this mechanism appears to be functioning in Estonia is an amazing outcome for a newly emerging market economy.

The analysis thus far relies on broad brush analysis of averages, but conclusive evidence requires comparative static analysis. We utilize a standard Mincerian(1974) log wage function to capture changes in marginal returns to human capital and demographic characteristics over time. The earnings functions for each year are reported in Table 3 along with tests of the significance of the difference in returns over the transition. The goodness-of-fit measures indicate that the proportion of wages unexplained by observed human capital declines during transition. This implies that variance in pay for workers with the same human capital attributes declined, consistent with the earlier finding of reduced wage dispersion within human capital groups.

The pattern of estimated marginal returns to education and experience in Table 3 is virtually identical to that implied by the graphical analysis. Returns to education rise sharply between 1989 and 1992, and continue to rise thereafter. While returns rise for all education groups, the increases get larger and more significant for progressively higher education groups. The time path of changing returns relative to a primary degree are illustrated in Figure 4. The magnitude of the gains is striking. By 1995, university educated workers had gained 73 percentage points (exp(.66) - exp(.186)) relative to the least-educated workers. The adjustment to the movement away from centrally directed wage structures was very rapid, with the majority of the adjustment occurring by 1992.

It is possible that increasing returns to education are restricted to younger workers, so that more experienced cohorts do not face the same wage-education profiles. For example, some have argued that skills acquired under the centrally-planned system lose value under a market system.[15]

However, if as is typically assumed, education is generally valuable in many sectors, it is unclear why returns to schooling should be system-specific. To test whether rising relative returns occur at all ages, log wage equations were estimated for five different experience cohorts, those with 0-10, 11-20, 21-30, 31-40 and 40+ years of experience in 1989. Representative estimates from those regressions are reported in Table 4. These results strongly solidify the conclusion that returns to education rose dramatically in transition. Estimated returns relative to primary education rise for 18 of 20 cohort/education cells with the most dramatic increases for university educated workers in all experience groups. Therefore, education holds its relative value for all age groups.

From cross-section regression results it appears that returns to experience fell during the transition. In 1989, the implied peak in life cycle earnings occurred at 21.5 years of experience or about 40 years of age.[16] Transition shifted the peak sharply toward younger ages. The peak years of experience falls to 10.8 years by 1995. Such evidence has been used to argue that firm- or sector-specific work experience acquired under the old system lost value under the market system. Once again, if work experience is generally valuable, it is not obvious why returns to experience should fall, particularly when other forms of human capital are experiencing rising relative returns. Further investigation suggests that the apparent reduction in the age of peak earnings is a fiction of the cross-sectional data because of rapidly changing vintage effects in wage profiles.

If returns to experience are rising rapidly, but at a diminishing rate, cross sectional returns will underestimate the true expected life-cycle returns for newer cohorts under the newly emerging labor market. To test this, we divided the 1989 and 1994 cohorts into five year experience cohorts, and then reestimated log wage equations with a series of experience cohort

dummy variables replacing the quadratic in experience terms. Changes in cohort-specific returns to experience can be traced out by matching 1989 cohort coefficients with 1994 coefficients for the same cohort. For example, the cohort with 0-5 years of experience in 1989 will have returns to experience measured by the dummy variable with 6-10 years of experience in 1994. The path of these cohort specific profiles is shown in Figure 5. Returns to experience increased for nearly every cohort, the exception being the cohort with 20-25 years of experience in 1989. The youngest cohorts did experience sharply rising wages early in their careers and appear to be moving to progressively higher and higher profiles.[17]

These results show that the flattening of age-earnings profiles in transition can result from sharply rising returns to experience, consistent with an overall pattern of rising returns to human capital generally. Human capital theory predicts that the young have the greatest incentive to invest in human capital because of their longer length of time to recoup the investment. Thus, the more rapid apparent growth in returns to experience for the youngest groups in Estonia is consistent with their greater incentive to invest in firm-specific human capital under a system in which returns to that investment are increasing. The flattening cross-sectional age-earnings profile is masking very sharply increasing longitudinal age-earnings profiles. It is possible that reported falling returns to experience in other settings are attributable to a similar pattern of sharply increasing returns to experience which atypically benefit the young.[18]

The Estonia data does allow a more direct test of the hypothesis that firm-specific skills acquired under the old system lost value in transition. The survey elicited information on firm tenure, a commonly used proxy for firm-specific human capital. The wage-job tenure profiles have not changed significantly over the period, although returns did fall early in transition The implied peak return to job tenure occurs beyond the normal work career throughout the period,

although the coefficients imply that the profile of returns is becoming more concave. However, there is no evidence of either rising or falling returns to tenure in the Estonian transition.

In 1989, women earned an average of 31 percent (1-exp(-.365)) less than men, holding human capital characteristics fixed. Transition raised relative pay for women, but all of the improvement occurred by 1992. Since then, real wages for women have fallen. By 1995, the wage gap was 25 percent. Thus, women gained relative to men as the labor market liberalized. The results in Table 4 indicate that the gain for women occurred at every experience level.

Immigrants fared much more poorly. In 1989, foreign born workers' wages averaged just 3 percent less than native-born Estonians. The relative wage gap for immigrants increased to 11 percent by 1992 and continued to increase thereafter. By 1995, the wage gap had grown to 22 percent. The cohort-specific wage regressions in Table 5 show that the falling returns for nonEstonians occurred at every experience level. The underlying cause of these declining wages is not clear. It is not attributable to language because ability to speak Estonian is included as a separate regressor, and because returns to Estonian language ability only rise by a small amount over the period. Separate wage regressions suggest that part of the answer lies in returns to human capital: immigrants did not face the same rising relative returns to human capital that were found for the economy as a whole. This suggests that immigrant educational attainment did not translate into mobility toward sectors with rising returns to skill, or that those returns to skill were not obtained.

The remaining results deal with type of employment or firm. Workers on cooperatives lost their wage advantage immediately upon transition, and their relative wages fell further as transition progressed. Workers in private firms had a large advantage before the transition, presumably reflecting their relative scarcity. As private ownership expanded and as less profitable

state enterprises joined the ranks of private firms, the private sector wage premium disappeared. Workers in firms partly or wholly owned by foreign nationals have not lost their wage advantage, however, regardless of experience level. It is likely that the wage premium in part reflects language ability since workers in foreign-owned firms must typically converse in both Estonian and the language of the owners. Small firms (under 10 employees) lost their wage advantage relative to large firms (over 100 employees). Relative pay for workers in medium sized firms remained unchanged.

Relative wages for manufacturing and agriculture fell, reflecting the large shifts in relative labor demand away from those sectors. Other things equal, relative agricultural wages fell 36 percent, while manufacturing wages fell 6 percent. On the other hand, relative wages in finance rose 86 percent as relative demand in that sector rose dramatically. The only relative wage change that seems at variance with a labor demand story is a 7 percent decline in relative wages for hotel and restaurant workers, despite an increase in employment. This last outcome may reflect a change in the way hotel and restaurant services are produced. In particular, despite the increase in employment, the number of university educated and highly experienced workers in the sector declined.

IV. Conclusions

Central and Eastern European countries have chosen numerous different paths toward market systems. Estonia represents a case of rapid liberalization of prices and wages with few barriers to labor mobility across sectors. A retrospective survey of employment and wage outcomes for 9,608 working age Estonians yielded evidence of large redeployment of labor out of traditional manufacturing and agriculture toward sectors of rising labor demand. The redeployment appears to follow wage signals provided by the market. As a consequence, Estonia

appears to be adjusting to changes in economic structure with less loss of employment and more rapid development of new sectors than other transition economies.

The major empirical findings include:

1) Relative returns to education rose rapidly during transition, as did relative employment of more educated workers. The advantages of the more educated occur for all experience cohorts and across all sectors of the economy. From an egalitarian wage structure that showed little individual return to human capital in 1989, the education/wage structure rapidly transformed to a typical market pattern during transition.

2) Returns to experience rise for most experience cohorts, but rise most rapidly for the young. As a consequence, cross-sectional wage/experience profiles understate cohort-specific wage growth. Relative employment also rises for younger workers.

3) Wage dispersion increased across human capital groups. On the other hand, wage dispersion narrowed within human capital groups, consistent with the predicted effect of labor mobility on wages for comparably skilled workers.

4) Women lost relative employment share in most sectors, but experienced increasing relative wages. On the other hand, immigrants lost both employment share and relative wages.

5) Relative wages declined in sectors with the largest reductions in employment and rose in sectors with the largest gains in employment. The consistency of this pattern of rising relative wages associated with rising relative employment for human capital and ethnic groups are suggestive of a well-functioning labor market responding to demand shocks.

Endnotes

1. See Commander and Coricelli (1995) for a broad overview. Specific country studies include Jones and Kato (1993) for Bulgaria, Ve ernik (1995) for the Czech Republic, Pudney (1994) for Hungary, Chase (1995) and Ham, Svejnar and Terrell (1994) for the Czech Republic and Slovakia, Krueger and Pischke (1995) for East Germany, Rutkowski (1996) for Poland and Orazem and Vodopivec (1995) for Slovenia.

2. T.W. Schultz (1975) argued that entrepreneurial skill (which he believed to be highly correlated with education) increased in value in disequilibrium. In steady state, (and no state was as steady as the state economy) these skills are of limited value since rules of thumb are perfectly satisfactory under unchanging environments.

3. Few labor market surveys on former Soviet states have taken place. To the best of our knowledge, most of the current information comes from: (1) the World Bank survey of some 40 enterprises in the Moscow region (Commander et al., 1993); (2) the ILO surveys of enterprises in Russia (Standing et al., 1994); (3) Linz' (1993) survey of 845 residents of Taganrog, Russia; and (4) Johnson and Ustenkos' (1993) 1992 survey of 350 laid off Ukrainian workers.

4. Relative to other transition economies, Estonia's labor market demonstrates much more evidence of flexibility. As shown in Appendix Table 1, since 1989, transitions out of employment increased during transition, a common result in transition economies. However, by 1994, roughly half of the transitions out of a given job were to other jobs in the economy, with the remainder being transitions into either unemployment or out of the labor force. Forty-six percent of the unemployed in 1994 found work within a year, and just under 12 percent of those out of the labor force were employed within a year. While these are low transition rates by market economy standards, they are very high for a transition economy.

5. See Topel (1983) for evidence of how unemployment insurance affects firm employment and layoff decisions.

6. A proposal to impose an unemployment insurance tax on firms is currently under consideration.

7. In 1992, 10 percent of workers were paid the minimum wage, but 14 percent were paid below the minimum, suggesting that enforcement may have been lax. By 1993, inflation made the minimum wage all but irrelevant: only 2 percent were paid the minimum, while another 2 percent were paid below the minimum. In 1994 and 1995, less than one percent of workers were paid the minimum wage, while around 3 percent were paid below the minimum.

8. According to World Bank (1994) figures in 1990, Estonia had the seventh highest proportion of the population over 60 of 24 former Eastern European and Soviet states, but at 6.9 percent still had the seventh lowest proportion of GDP in pensions. By 1993, the proportion of GDP in pensions had fallen to 5.1 percent.

9. See Orazem and Vodopivec (1995), pp.223-226.

10. Several countries have tried to encourage retirements to "make room" for younger workers. The assumption underlying these policies is that the labor market is made up of a fixed number of slots to be filled, and that older workers occupying these jobs prevent young workers from occupying the jobs. In fact, young workers are not close substitutes with older workers, and they may be complements in production. If, for example, experienced workers have a comparative advantage in planning or management, removing them from the labor force will cause a shortage of the skills needed most critically in a transition economy. Thus, increasing early retirements may lower the number of jobs, not raise them. In Slovenia where the pension policy was most extreme, firms face a pension burden of nearly 15 percent of GDP and the employment share of the young fell. See Orazem and Vodopivec (1995).

11. The use of a common reference month for each year insures that changes over time are not attributable to seasonal variation in employment or wages. Because of temperature extremes, the Estonian labor market has significant changes in employment from summer months to winter months.

12. Special secondary degrees involved an additional year of schooling.

13. This is the Levy and Murnane (1992) Economics 1 test. Rising relative wages and relative employment are consistent with demand-side explanations of wage growth, while rising relative wages and falling relative employment are consistent with supply-side shifts.

14. Rising returns to education have been found by Ve ernik (1995) for the Czech Republic, Rutkowski (1996) for Poland, and Orazem and Vodopivec (1995) for Slovenia.

15. Rutkowski (1996, p. 98) reported that rising returns to education in Poland were restricted to younger workers, but presents no formal evidence. Flanagan (1993) argued that vocational training lost value in the Czech Republic due to obsolescence caused by the transition.

16. The experience and tenure variables are measured in months. The implied peak wage occurs at 257 months or 21.5 years of experience. Ve ernik (1995, Table 2) reports coefficients suggesting falling age of peak earnings for men, but rising peak earnings for women. Years to peak earnings also rose in Poland (Rutkowski, 1996).

17. The rising experience premium for experience coupled with falling employment shares for the oldest workers suggest a selection process by which the most productive workers remain employed and the least productive retire. Orazem and Vodopivec (1995) found the same selection process at work in Slovenia.

18. For example, Bird, Schwarze and Wagner (1994) argued that returns to experience fell in East Germany following transition. Their results relied on analysis of a single cross-section of earnings, so it is possible that their results are clouded by similar sharp increases in returns to experience for young workers. Flanagan (1993) hypothesized that a similar vintage effect might explain flattening age earnings profiles in the Czech Republic.

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Table 1: Relative Employment by Work Experience and Industry in Estonia, October, 1989 to October, 1994

Industry	0-5 years	6-10 years	11-20 years	21-30 years	31-40 years	41 + years	Total	1989 Share of Workers [c]
Agricul-ture	0.44 [-0.13]	0.46 [-0.11]	0.59 [0.04]	0.55 [0.00]	0.60 [0.05]	0.54 [-0.01]	0.55 [-0.35]	0.20
Manufac-turing	0.91 [0.16]	0.81 [0.06]	0.73 [-0.02]	0.77 [0.02]	0.66 [-0.09]	0.72 [-0.03]	0.75 [-0.15]	0.27
Utilities	1.88 [0.63]	1.13 [-0.12]	1.25 [0.00]	1.34 [0.11]	1.48 [0.23]	0.68 [-0.57]	1.25 [0.35]	0.02
Construc-tion	0.76 [-0.11]	0.94 [0.07]	0.93 [0.06]	0.89 [0.02]	0.84 [-0.03]	0.66 [-0.21]	0.87 [-0.03]	0.08
Retail/ Wholesale	2.16 [0.59]	2.08 [0.51]	1.50 [-0.07]	1.47 [-0.10]	1.15 [-0.42]	1.00 [-0.57]	1.57 [0.67]	0.08
Hotel/ Restaurant	1.52 [0.41]	1.21 [0.10]	1.44 [0.33]	0.76 [-0.35]	0.80 [-0.31]	1.00 [-0.11]	1.11 [0.21]	0.02
Transport Telephone	0.84 [-0.16]	1.00 [0.00]	0.96 [-.04]	1.13 [0.13]	1.03 [0.03]	0.91 [-0.09]	1.00 [0.10]	0.08
F.I.R.E.	3.40 [0.98]	4.75 [2.33]	1.89 [-0.53]	1.33 [-1.09]	2.17 [-0.25]	1.00 [-1.42]	2.42 [1.52]	0.005
Business Services	1.65 [0.66]	0.83 [-0.16]	0.88 [-0.11]	0.99 [0.00]	0.94 [-0.05]	1.00 [0.01]	0.99 [0.09]	0.04
Govern-ment	2.08 [0.84]	1.19 [-0.05]	1.01 [-0.23]	1.07 [-0.17]	1.54 [0.30]	1.06 [0.18]	1.24 [0.34]	0.04
Education	0.68 [-0.38]	1.06 [0.00]	1.11 [0.05]	1.05 [-0.01]	1.19 [0.13]	1.42 [0.36]	1.06 [0.16]	0.06
Health	0.86 [-0.20]	0.94 [-0.12]	0.96 [-0.10]	1.43 [0.37]	1.19 [0.13]	0.84 [-0.22]	1.06 [0.16]	0.06
Other Service	1.33 [0.36]	0.97 [0.00]	0.78 [-0.19]	1.11 [0.14]	0.86 [-0.11]	0.88 [-0.09]	0.97 [0.07]	0.04
Total	1.02 [.12]	0.94 [0.04]	0.90 [0.00]	0.91 [0.01]	0.86 [-0.04]	0.79 [-0.11]	0.90 [0.00]	1.00
Share,'89	0.12	0.12	0.25	0.24	0.20	0.08	1.00	

[a]1994 relative to 1989 employment for the experience/industry cell. The experience/industry cell ratio minus the ratio for the industry as a whole is in brackets.

[b]Industry employment in 1994 relative to 1989. This ratio minus that for the economy as a whole is in brackets.

[c]The industry share of total 1989 employment.

Source: Compilations based on the Estonia Labor Force Survey

Table 2: Relative Employment by Education and Industry in Estonia, October, 1989 to October, 1994

Industry	Less Than Elementary[a]	Elementary[a]	Secondary[a]	Special Secondary[a]	University [a]	Total [b]	1989 Share of Workers[c]
Agriculture	0.44 [-0.11]	0.53 [-0.02]	0.58 [0.03]	0.53 [-0.02]	0.59 [0.04]	0.55 [-0.35]	0.20
Manufac-turing	0.39 [-0.36]	0.69 [-0.06]	0.81 [0.06]	0.78 [0.03]	0.77 [0.02]	0.75 [-0.15]	0.27
Utilities	0.44 [-0.82]	1.00 [-0.26]	1.34 [0.08]	1.46 [0.20]	1.38 [0.12]	1.26 [0.36]	0.02
Construc-tion	0.37 [-0.50]	0.65 [-0.22]	1.06 [0.19]	0.81 [-0.06]	0.83 [-0.04]	0.87 [-0.03]	0.08
Retail/ Wholesale	0.50 [-1.07]	1.35 [-0.22]	1.64 [0.07]	1.54 [-0.03]	1.98 [0.41]	1.57 [0.67]	0.08
Hotel/ Restaurant	0.75 [-0.36]	0.82 [-0.29]	1.19 [0.08]	1.26 [0.15]	0.71 [-0.40]	1.11 [0.21]	0.02
Transport/ Telephone	0.52 [-0.48]	0.83 [-0.17]	0.99 [-0.01]	1.15 [0.15]	1.29 [0.29]	1.00 [-0.10]	0.08
F.I.R.E.	NA	1.00 [-1.42]	3.00 [0.58]	1.44 [-0.98]	5.00 [2.58]	2.42 [1.52]	0.005
Business Services	0.67 [-0.32]	0.87 [-0.12]	1.13 [0.14]	0.93 [-0.06]	0.96 [-0.03]	0.99 [0.09]	0.04
Govern-ment	0.25 [-0.99]	1.89 [0.65]	1.57 [0.33]	1.12 [-0.12]	1.06 [-0.18]	1.24 [0.34]	0.04
Education	0.47 [-0.59]	0.88 [-0.18]	1.15 [0.09]	1.14 [0.08]	1.07 [0.01]	1.06 [0.16]	0.06
Health	0.40 [-0.66]	0.67 [-0.39]	1.30 [0.24]	1.08 [0.02]	1.12 [0.06]	1.06 [0.16]	0.06
Other Service	0.50 [-0.47]	0.62 [-0.35]	1.05 [0.08]	1.06 [0.09]	0.98 [0.01]	0.97 [0.07]	0.04
Total	0.44 [-0.46]	0.71 [-0.19]	0.99 [0.09]	0.94 [0.04]	1.01 [0.11]	0.90 [0.00]	1.00
Share,1989	0.06	0.16	0.38	0.23	0.16	1.00	

[a]1994 relative to 1989 employment for the education/industry cell. The education/industry cell ratio minus the ratio for the industry as a whole is in brackets.

[b]Industry employment in 1994 relative to 1989. This ratio minus that for the economy as a whole is in brackets.

[c]The industry share of total 1989 employment.

Source: Compilations based on the Estonia Labor Force Survey

Table 3: Log Wage Regressions for Estonia, 1989-1995

Variable	1989	1992	1993	1994	1995	1995-1989
Elementary	.039 (1.02)	.115 (2.38)	.102 (2.09)	.146 (2.84)	.140 (2.50)	.101 (1.52)
Secondary	.081 (2.18)	.217 (4.62)	.184 (3.89)	.234 (4.71)	.250 (4.60)	.169 (2.98)
Special Secondary	.105 (2.74)	.311 (6.49)	.330 (6.85)	.367 (7.26)	.373 (6.77)	.268 (4.70)
University	.186 (4.51)	.480 (9.59)	.542 (10.9)	.631 (12.1)	.660 (11.7)	.474 (8.65)
Experience /100	.139 (6.80)	.034 (1.61)	.042 (2.17)	.055 (2.93)	.052 (2.60)	-.087 (3.20)
Experience^2 /10000	-.027 (7.45)	-.008 (2.04)	-.015 (4.16)	-.020 (5.72)	-.020 (5.41)	.007 (1.70)
Tenure/100	.055 (2.39)	-.028 (1.16)	.024 (1.08)	.051 (2.23)	.079 (3.32)	.024 (.41)
Tenure^2 /10000	-.001 (.24)	.012 (2.13)	.006 (1.04)	-.003 (.50)	-.008 (1.37)	-.007 (.68)
Female	-.365 (21.2)	-.217 (11.8)	-.273 (16.2)	-.292 (17.2)	-.288 (16.3)	.077 (3.15)
Foreign-Born	-.032 (1.33)	-.115 (4.47)	-.174 (7.37)	-.232 (9.80)	-.244 (9.83)	-.212 (4.25)
Speak Estonian	.019 (.69)	.001 (.027)	.029 (1.04)	.047 (1.69)	.052 (1.78)	.033 (.30)
Cooperative	.096 (3.85)	-.028 (.96)	-.077 (2.58)	-.126 (3.95)	-.154 (4.57)	-.250 (6.23)
Private Firm	.495 (11.5)	.120 (4.06)	.026 (1.14)	.017 (.73)	-.003 (.11)	-.498 (10.2)
Foreign Ownership	.104 (1.55)	.249 (5.37)	.258 (7.32)	.260 (8.30)	.243 (8.09)	.139 (2.32)
Small Firm	.095 (2.13)	.035 (1.00)	-.040 (1.41)	-.124 (4.49)	-.143 (5.04)	-.238 (5.10)
Medium Firm	-.037 (1.67)	-.019 (.86)	-.035 (1.79)	-.060 (3.09)	-.045 (2.22)	-.008 (.77)
R^2	.19	.17	.25	.29	.30	
N	6327	5852	5666	5809	5503	

Regressions include controls for industry and county. T-statistics in parentheses.

Table 4: Selected Coefficients from 1989 to 1994 Wage Regressions by Experience Cohort

	Experience Cohort									
	0-10		11-20		21-30		31-40		41+	
	1989	1995	1989	1995	1989	1995	1989	1995	1989	1995
Elementary	.172 (.89)	-.011 (.06)	-.11 (.70)	.267 (.75)	.139 (1.70)	.206 (1.46)	.058 (.94)	.111 (1.20)	-.025 (.34)	.192 (1.72)
Secondary	.308 (1.63)	.198 (1.12)	-.136 (.87)	.336 (.96)	.134 (1.73)	.188 (1.38)	.041 (.66)	.276 (3.05)	-.056 (.67)	.284 (2.52)
Special Secondary	.361 (1.90)	.256 (1.51)	-.136 (.87)	.509 (1.45)	.131 (1.64	.328 (2.39)	.099 (1.56)	.415 (4.43)	.088 (.92)	.427 (3.66)
University	.352 (1.83)	.536 (3.10)	-.054 (.34)	.789 (2.24)	.265 (3.19)	.632 (4.57)	.286 (3.79)	.732 (7.65)	.182 (1.38)	.76 (5.56)
Female	-.385 (10.5)	-.347 (9.94)	-.373 (12.0)	-.276 (8.03)	-.350 (10.3)	-.239 (7.31)	-.329 (8.53)	-.276 (6.97)	-.394 (6.31)	-.242 3.08)
Foreign Born	.038 (.88)	-.336 (8.01)	-.076 (2.40)	-.293 (7.09)	-.100 (2.48)	-.233 (6.21)	-.035 (.76)	-.238 (5.08)	-.061 (.83)	-.125 (1.36)

t-statistics in parentheses.

Appendix Table 1:Estimated annual transition probabilities from employment, unemployment and out of the labor force, 1989-1994

Percent of individuals:	1989	1992	1994
Employed in January of the year who by January of the next year were:			
Employed	94.7	84.3	87.8
in the same job	89.4	71.6	75.3
in a different job	5.3	12.7	12.5
Unemployed	0.4	5.2	5.3
Out of the labor force	5.0	10.5	6.9
Unemployed in January of the year who by January of the next year were:			
Employed	56.5	40.5	45.9
Unemployed	41.3	49.3	43.3
Out of the Labor Force	2.2	10.1	10.9
Out of the labor force in January of the year who by January of the next year were:			
Employed	8.9	10.1	11.7
Unemployed	0.6	3.0	4.6
Out of the Labor Force	90.5	86.9	83.7

Source: Tabulations based on the Estonian Labor Force Survey

Figure 1: Wage for Experience Cohort Relative to Economy Average, 1989, 1992, and 1994.

Figure 2: Wage for Education Group Relative to Economy Average, 1989, 1992, and 1994.

Figure 3A: Wage-Experience Profiles Relative to Economy Average, by Education Level, 1989.

Figure 3B: Wage-Experience Profiles Relative to Economy Average.

Figure 4: Estimated Return Relative to Primary Education for Education Levels, by Year.

Figure 5: Path of Cohort-specific Returns to Experience, Relative to 45+ Years of Experience, 1989, 1994.